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NEW HAMPSHIRE COLLEGE

AGRICULTURAL EXPERIMENT STATION

INSPECTION OF FERTILIZERS

IN 1903

In Coöperation with the State Board of Agriculture

ANALYSES OF WOOD ASHES AND MISCELLANEOUS FERTILIZING MATERIALS

NEW HAMPSHIRE COLLEGE

OF

AGRICULTURE AND THE MECHANIC ARTS

DURHAM

NEW HAMPSHIRE COLLEGE

OF

AGRICULTURE AND THE MECHANIC ARTS

AGRICULTURAL EXPERIMENT STATION

DURHAM, N. H.

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THE FERTILIZER INSPECTION IN 1903.

In accordance with the Public Statutes, the secretary of the State Board of Agriculture, Hon. N. J. Bachelder, caused to be collected and analyzed samples of all the brands of fertilizers licensed for sale in this state.

The samples were drawn by Percy A. Campbell and Harold N. Knight of the New Hampshire college, and delivered to the chemist of the Agricultural Experiment Station, Fred W. Morse, who was assisted in the analytical work by Lucian A. Hill, Harold H. Scudder, and Warren C. Hayes.

Ninety-three different brands were examined. Of these, nineteen were found to be deficient in their composition; but with the exception of one brand, the deficiency in each case was limited to one constituent, and an excess was usually present in one or more of the other ingredients.

There were five deficiencies in nitrogen, six in potash, and nine in available phosphoric acid. This was slightly more in proportion to the number of brands than in the previous year.

COMPOSITION OF COMMERCIAL FERTILIZERS SAMPLED AND ANALYZED IN 1903.

MANUFACTURER AND BRAND.	Nitrogen.				Phosphoric Acid.							Potash.	
			Total.				Available.			Total.			
	Inorganic.*	Organic.*	Found.	Guaranteed.	Soluble.	Reverted.	Found.	Guaranteed.	Insoluble.	Found.	Guaranteed.	Found.	Guaranteed.
AMERICAN AGRICULTURAL CHEMICAL CO.													
Bradley's Corn Phosphate	.20	1.77	1.97	2.06	5.40	3.10	8.50	8.00	2.30	10.80	10.00	1.94	1.50
Bradley's Complete Manure for Potatoes and Vegetab's	.29	2.56	2.85	3.30	2.85	5.05	7.90	8 00	2.25	10.15	9.00	7.01	7.00
Bradley's Complete Manure for Top Dressing	.70	4.52	5.22	4.95	1.55	3.90	5.45	5.00	.85	6.30	6.00	3.10	2.50
Bradley's Complete Manure with 10 per cent. Potash	.38	2.86	3.24	3.30	2.20	3.75	5.95	6.00	2.55	8.50	7.00	12.06	10.00
Bradley's Eclipse Phosphate	.....	1.20	1.20	1.03	5.10	3.10	8.20	8 00	2.70	10.90	10.00	1.94	2.00
Bradley's Potato Fertilizer	.28	1.84	2.12	2.06	4.70	3.75	8.45	8.00	1.60	10.05	10.00	3.10	3.00
Bradley's Potato Manure	.28	1.95	2.23	2.50	3.95	3 02	6.97	6.00	1.60	8.57	8.00	5.39	5.00
Bradley's XL Superphosphate	.25	2.11	2.36	2 50	5.40	4.80	10.20	9.00	1.80	12.00	11.00	1.94	2.00
Clark's Cove Bay State Fertilizer G. G	.46	1.70	2.16	2.06	5.40	3.55	8.95	8.00	2.10	11.05	10.00	1.71	1.50
Clark's Cove King Philip's Alkaline Guano	.....	1.22	1.22	1.03	5.95	3.25	9.20	8.00	3.70	12.80	10.00	2.18	2.00
Clark's Cove Potato Fertilizer	.42	1.77	2.19	2.06	5.60	3.05	8.65	8.00	2.15	10.80	10.00	3.15	3.00
Cleveland Fertilizer for All Crops	.....	1.12	1.12	1.03	5.55	3.05	8 60	8 00	2.80	11.40	10.00	2 23	2.00
Cleveland Potato Phosphate	.53	1.64	2.17	2.06	6.10	2.55	8.65	8 00	1.65	10.30	10 00	3.83	3 00
Cleveland Superphosphate	.24	1.93	2.17	2.06	3.40	4.90	8.30	8.00	3.70	12.00	10.00	1.75	1.50
Crocker's Corn Phosphate	.....	2.20	2.20	2 06	4.80	4.55	9.35	8.00	2.95	12.30	10 00	1.56	1.50
Crocker's Grass and Oats Fertilizer	.....	.....	.....	.....	6.05	5.15	11.20	11.00	1.25	12.45	12 10	2.20	2.00
Crocker's New Rival Ammoniated Superphosphate	.....	1.19	1.19	1.03	6.35	5.40	11.75	8.00	2.30	14.05	10.00	2.51	2.00
Crocker's Potato, Hop, and Tobacco	.42	1.67	2.09	2.06	4.95	3.30	8.20	8 00	2.25	10.50	10.00	3.48	3.00
Crocker's Potato Special Manure	.19	2.91	3.10	3.30	4.20	2.70	6.90	6.00	1.75	8.65	7.00	10.58	10.00
Cumberland Guano for All Crops	.....	1.19	1.19	1.03	4.90	3.75	8 65	8.00	2.85	11.05	10 00	1.96	2.00
Cumberland Potato Fertilizer	.81	1.10	1.91	2.06	6.30	3.15	9.45	8.00	2.75	12.20	10.00	3.48	3.00
Cumberland Superphosphate	.70	1.35	2.05	2.06	5.60	3.10	8.70	8.00	2 50	11.20	10.00	1.76	1.50
Darling's Farm Favorite	.63	1.53	2.16	2.06	4.35	3 75	8.10	8.00	3.55	11.65	9 00	4.29	3.00
Darling's General Fertilizer	.....	1.54	1.54	1.24	4.40	2.05	6.45	6.00	3.40	9.85	7.00	4.15	3.00

Darling's New Hampshire Special	.96	2.25	3.21	3.30	4.25	3.24	7.49	8 00	2.81	10.30	9.00	6.86	7.00
Darling's Potato Manure	.76	1.50	2.26	2.47	4.25	2.45	6.70	6.00	1.95	8.65	7.00	6.24	5.00
Great Eastern Garden Special	.93	2.27	3.20	3.30	4.60	3.95	8.55	8.00	2.40	10.95	9 00	7.46	7.00
Great Eastern General Fertilizer	.....	.94	.94	.82	3.25	1.94	5.19	8.00	4.01	9.20	9.00	4.10	4.00
Great Eastern Grass and Oats Fertilizer	.....	.....	.....	.....	5.05	5.47	10.52	11.00	1.45	11.97	12.00	2.31	2.00
Great Eastern Northern Corn Special	.74	1.43	2.17	2.06	4.90	4.65	9.55	8.00	1.60	11.15	10.00	2.16	1.50
Great Eastern Potato Manure	.77	1.25	2.02	2.06	3.75	4.65	8.40	8.00	2.80	11.20	10.00	3.80	3.00
Packer's Union Animal Corn Fertilizer	.62	1.64	2.23	2.50	6.05	2.77	8.82	9 00	2.25	11.07	11.00	2.50	2.00
Packer's Union Gardeners' Complete Manure	.46	1.87	2.33	2.40	3.55	3.50	7.05	6.00	1.75	8.90	7.00	9.56	10.00
Packer's Union Potato Manure	.83	1.29	2.12	2.06	5.65	2.35	8.00	6.00	2.00	10.00	10.00	6.16	6.00
Packer's Union Universal Fertilizer	.....	.96	.96	.82	4.75	2.82	7.57	8.00	2.40	9.97	10.00	4.36	4.00
Packer's Union Wheat, Oats, and Clover Fertilizer	.....	.....	.....	.....	5.20	5.00	10.20	11.00	1.95	12.15	12.50	2.58	2.00
Pacific Nobsque Guano	.55	1.51	2.06	2.06	6.60	2.30	8.90	8.00	1.90	10.80	10.00	1.73	1.50
Pacific Potato Special	.60	1 64	2.24	2.06	5.75	2.80	8.55	8.00	2.05	10.60	10.00	3.21	3.00
Quinnipiac Corn Manure	.....	1.95	1.95	2.06	3.35	4.75	8.10	8 00	5.00	13.10	10.00	1.57	1.50
Quinnipiac Climax Phosphate for All Crops	.78	.30	1.08	1.03	3.90	4.60	8.50	8.00	3.10	11.60	10.00	4.28	2 00
Quinnipiac Potato Phosphate	.91	1.14	2 05	2.06	5.85	3.35	9.20	8.00	2.20	11.40	10.00	2.84	3.00
Read's Farmers' Friend	.49	1.60	2.09	2.06	4.35	3.37	7.72	8.00	2.05	9.77	10.00	3.24	3.00
Read's Potato Manure	.38	2.04	2.42	2.07	4.70	2.50	7.20	6.00	1.90	9.10	7.00	9.94	10.00
Read's Practical Potato Special	.....	.83	.83	.82	1.75	2.80	4.55	4.00	2.35	6 90	5.00	9.38	8.00
Read's Standard Superphosphate	.....	1.08	1.08	.82	3.40	4.70	8.10	8.00	4.00	12.10	10.00	4.11	4.00
Read's Vegetable and Vine Fertilizer	.....	2.20	2.20	2.06	5.45	4.20	9.65	8.00	2.40	12.05	10.00	6.76	6.00
Soluble Pacific Guano	.73	1.32	2.05	2.06	6.50	2 30	8.80	8.00	1.90	10.70	10.00	1.69	1.50
Williams & Clark's Americus Corn Phosphate	.63	1.49	2.12	2.06	4.50	4.15	8.65	8.00	3.35	12.00	10.00	1.63	1.50
Williams & Clark's Americus Potato Manure	.....	2.12	2.12	2 06	5.45	2.58	8.03	8.00	2.67	10.70	10.00	3.53	3.00
Williams & Clark's Prolific Crop Producer	.....	1.02	1.02	.82	3.05	4.00	7.05	7.00	3.55	10.06	8.00	1.07	1.00
BOWKER FERTILIZER CO.													
Bowker's Corn Phosphate	.....	1.74	1.74	1.00	5.40	3.00	8.40	8.00	2.20	10.60	10.00	2.47	2.00
Bowker's Farm and Garden Phosphate	.....	1.57	1.57	1.50	4.70	3.85	8.55	8.00	2.45	11.00	10.00	2.32	2.00
Bowker's Hill and Drill Phosphate	.74	1.56	2.30	2.25	6.60	2.90	9.50	8.00	1.50	11.00	11.00	1.97	2.00
Bowker's Potato and Vegetable Fertilizer	.....	1.67	1.67	1.50	6.70	2.37	9 07	10.00	1.95	11.02	11.00	2.23	2.00
Bowker's Potato and Vegetable Phosphate	.....	1.64	1.64	1.50	3.95	4.00	7.95	9.00	2.70	10 65	11.00	2.31	2 00
Bowker's Sure Crop Phosphate	.....	1.02	1.02	.83	4.80	3.20	8.00	9.00	3.10	11.10	11.00	2.79	2.00
Stockbridge Corn Manure	.79	2.35	3.14	3.00	3.50	3.48	6.98	7.00	2.20	9.18	8.00	7.49	7.00
Stockbridge Potato Manure	.91	2.26	3.17	2.00	4.40	2.05	6.45	6.00	1.90	8.35	7.00	9.75	10.00
E. FRANK COE CO.													
E. Frank Coe's High Grade Diss. Bone and Potash	.....	.....	.....	.....	8.85	2.60	11.45	10.50	2.65	14.10	12.50	1.86	2.00

COMPOSITION OF COMMERCIAL FERTILIZERS SAMPLED AND ANALYZED IN 1903.—*Continued.*

MANUFACTURER AND BRAND.	Nitrogen.				Phosphoric Acid.							Potash.	
			Total.				Available.			Total.			
	Inorganic.*	Organic.*	Found.	Guaranteed.	Soluble.	Reverted.	Found.	Guaranteed.	Insoluble.	Found.	Guaranteed.	Found.	Guaranteed.
Grass and Grain Special	.....	1.25	1.25	.80	7.10	2.55	9.65	8.50	2.95	12.60	10.00	2.43	1.50
Columbian Corn Fertilizer	.....	1.29	1.29	1.23	6 95	2.15	9.10	6.50	2.90	12.00	10.50	2.59	2.50
High Grade Ammoniated Bone Superphosphate	.....	1.90	1.90	1.85	7.40	1.95	9.35	9.00	1.80	11.15	12.50	2.51	2.25
Columbian Potato Fertilizer	.....	1.34	1.34	1.20	7.20	1.95	9.15	8.50	2.20	11.35	9.50	2.49	2.50
Celebrated Special Potato Fertilizer	.....	1.71	1.71	1.65	7.05	1.65	8.70	8.00	2.75	11.45	9.50	3.94	4.00
New England Potato Fertilizer	.....	1.18	1.18	.82	4.80	3.00	7.80	7.50	2.70	10.50	9.00	3.53	3.00
XXV Ammoniated Bone Superphosphate	.....	1.13	1.13	.80	6.70	2.45	9.15	8.50	2.45	11.60	10.00	2.07	1.50
LISTER'S A. C. WORKS.													
Lister's Bone and Potash	.....	.....	.....	.....	5.75	4.45	10.20	10.00	1.80	12.00	11.00	2.32	2.00
Lister's High Grade Special	.59	1.07	1.66	1.65	3.65	4.05	7.70	8.00	3.15	10.85	10.00	10.37	10.00
Lister's Potato Manure	1.53	1.59	3.12	3.30	2.90	4.55	7.45	8.00	3.00	10.45	9.00	6.53	7.00
Lister's Special Corn	.70	.90	1.60	1.65	6.00	2.95	8.95	8.00	2.00	10.95	9.00	3.00	3.00
Lister's Success Fertilizer	.....	1.30	1 30	1.65	7.45	1.75	9.20	9.00	2.85	12.05	11.00	2.11	2.00
Special Potato	.....	1.54	1.54	1.65	5.65	2.65	8.30	8.00	2.15	10.45	9.00	3.04	3.00
LOWELL FERTILIZER CO.													
Lowell Bone Fertilizer for Corn and Grain	.....	1.89	1.89	1.64	6.65	2.70	9.35	8.00	.90	10.25	9.00	2.74	3.00
Swift's Lowell Animal Brand	.59	1.85	2 44	2.46	7.80	.85	8.65	9.00	1.75	10.40	10.00	4.27	4.00
Swift's Lowell Potato Manure	.....	1.70	1.70	1.64	4 60	3.15	7.75	7.00	1.40	9.15	8.00	4.11	4.00
Swift's Lowell Potato Phosphate	.....	2.37	2.37	2.47	4.90	3.45	8.35	8.00	1.70	10.05	9.00	5.97	6.00
NEW ENGLAND FERTILIZER CO.													
New England Corn Phosphate	.....	1.48	1.48	1.64	3.25	5.02	8.27	8.00	1.97	10.24	9.00	2.38	3.00

New England Potato Fertilizer	.....	1.87	1.87	1.64	5.00	2.30	7.30	7.00	1.50	8.80	8.00	3.82	4.00
OHIO FARMERS' FERTILIZER CO.													
Corn, Oats, and Wheat, Fish Guano	.38	.97	1.35	1.28	5.40	3.35	8.75	8.00	2.50	11.25	10.00	2.92	2.00
General Crop Fish Guano	.....	.85	.85	.82	1.25	5.90	7.15	7.00	2.75	9.90	8.00	1.84	1.00
Potato and Tobacco Special..	.21	1.67	1.88	1.65	4.95	4.50	9.45	8.00	2.15	11.60	10.00	4.52	4.00
PARMENTER & POLSEY FERTILIZER CO.													
P. and P. Potato	.....	1.71	1.71	1.60	2.25	4.80	7.05	6.00	2.20	9.25	7.00	6.31	6 00
Plymouth Rock Brand	.08	2.62	2.70	2.47	4.70	4.80	9.50	8.00	1.85	11.35	9.00	3.80	4.00
Special Potato Fertilizer	.67	2.67	3.34	3.30	5 45	3.10	8.55	8.00	.55	9.10	9.00	7.95	7.00
Star Brand Superphosphate	.....	1.68	1.68	1.04	3.30	4.30	7.60	7.00	2.50	10.10	8.00	3.48	2.50
RUSSIA CEMENT CO.													
Essex A1 Superphosphate	.....	1.01	1.01	1.00	2.30	2.69	4.99	7.00	6.26	11.25	9.00	2.08	2.00
Essex Complete Manure for Corn, Grain, and Grass	.46	2.67	3.13	3 30	4.40	3.00	7.40	7.00	4.15	11.55	9 50	10.37	9.50
Essex Complete Manure for Potatoes, Roots, and Veg's	.70	3 00	3.70	3.70	4.40	4.35	8.75	7.00	3.55	12.30	9.00	8.19	8.50
Essex Corn Fertilizer	.....	2.19	2.19	2.00	2.85	5.29	8.14	9.00	5.51	13.65	11.00	3.41	3.00
Essex Market Garden and Potato Manure	.65	1.64	2.29	2.00	3.95	4.20	8.15	8.00	3.55	11.70	10.00	5.96	5.00
Essex XXX Fish and Potash	.07	2.34	2.41	2.10	2.65	6.40	9.05	9.00	4.45	13.50	12 00	2.70	2.50
ABBOTT & MARTIN RENDERING CO.													
Abbott's Tobacco and Potato Special	.72	.56	1.28	1.64	4.40	4.10	8.50	8.00	2.90	11.40	10.00	5.09	4.00
Harvest King	.....	1.14	1.14	1.20	4.70	4.20	8.90	8.00	2.90	11.80	10.00	3.32	2.00

*Inorganic nitrogen is contained only in nitrates and ammonia salts, *i. e.*, nitrate of soda and sulphate of ammonia. It is the immediately available nitrogen. Organic nitrogen is the nitrogen contained in animal and vegetable matter, and is available in proportion to the rapidity of decay of the substances containing it.

ANALYSES OF WOOD ASHES AND CHEMICALS.

WOOD ASHES—FOUR SAMPLES.

Locality.	Moisture.	Soluble potash.	Total phosphoric acid.	Lime.
Peterborough	15.00	3.78	1.34	.....
Pittsfield	21.00	5.65	1.42	.....
Lancaster	.....	3.20	1.50	26.46
Dover	23.75	3.48	2.90	.....

NITRATE OF SODA—TWO SAMPLES.

From Laconia, 15.93 per cent. nitrogen.
From College Farm, 15.60 per cent. nitrogen.

SUPERPHOSPHATES—TWO SAMPLES.

Dissolved boneblack from Littleton.
Plain superphosphate from Laconia.

	Dissolved Boneblack.	Plain Superphosphate.
Soluble phosphoric acid,	15.90	9.35
Reverted phosphoric acid,	1.25	4.15
Available phosphoric acid,	17.15	13.50
Insoluble phosphoric acid,	1.85	3.20
Total phosphoric acid,	19.00	16.70

But one of the lots of wood ashes could be considered really good, on account of the comparatively low soluble potash. The nitrate of soda and superphosphates were of standard quality.

FRED W. MORSE, *Chemist.*

TRADE VALUES OF FERTILIZING INGREDIENTS IN RAW MATERIALS AND CHEMICALS, 1903.

	Cents per pound.
Nitrogen in ammonia salts	17.5
" nitrates	15.
" dry and fine ground fish, meat, and blood, and in high grade mixed fertilizers	17.0
" fine ground bone and tankage	16.5
" medium ground bone and tankage,	12.0
Phosphoric acid soluble in water	4.5
" " " ammonia citrate (reverted)	4.0
" " in fine ground bone, fish, and tankage	4.
" " in coarse bone and tankage	3.
" " in cotton-seed meal, castor-pomace, and wood ashes	4.
" " insoluble in mixed fertilizers	2.
Potash as sulphate free from chlorides and in wood ashes	5.
Potash as muriate	4.25

The above values are based on the wholesale market price for the materials, when sold in large lots at the principal trade centers in New England. The valuation of a ton of any mixed fertilizer based on the above figures will usually fall ten dollars below the retail price at the local agency. This variation includes such fixed charges as cost of mixing, bags, cartage, and freight, salaries and commissions of agents, and interest.

Nitrogen in the best animal fertilizers and in nitrates cost more in 1903 than in the previous year, while phosphoric acid was cheaper.

STATE OF NEW HAMPSHIRE.

CHAPTER 43, SESSION LAWS OF 1901.

An Act to Regulate the Sale of Fertilizers.

Section 1. Every lot or parcel of commercial fertilizer or fertilizer material sold or offered or exposed for sale within this state shall be accompanied by a plainly printed statement, clearly and truly certifying the number of net pounds of fertilizer in the package, the name, brand, or trademark under which the fertilizer is sold, the name and address of the manufacturer or importer, the location of the factory, and a chemical analysis stating the percentage of nitrogen, of potash soluble in distilled water, of phosphoric acid in available form soluble in distilled water, and reverted, and of total phosphoric acid.

Sect. 2. Before any commercial fertilizer is sold or offered or exposed for sale, the manufacturer, importer, or party who causes it to be sold or offered for sale, within this state, shall file with the secretary of the board of agriculture a certified copy of the statement named in section 1 of this act, and shall also deposit with said secretary, at his request, a sealed glass jar or bottle containing not less than one pound of the fertilizer, accompanied by an affidavit that it is a fair average sample thereof.

Sect. 3. The manufacturer, importer, agent, or seller of any brand of commercial fertilizer or fertilizer material shall pay for each brand on or before the first day of March, annually, to the secretary of the board of agriculture, an analysis fee, as follows, namely: ten dollars for the phosphoric acid, five dollars for the nitrogen, and five dollars for the potash, contained or claimed to be in the said brand of fertilizer, but the fee for any brand shall not exceed fifteen dollars; *provided*, that whenever the manufacturer or importer shall have paid the fee herein required, any person acting as agent or seller for such manufacturer or importer shall not be required to pay the fee named in this section.

Sect. 4. No person shall sell or offer or expose for sale in this state any pulverized leather, hair, or wool waste, raw, steamed, roasted, or in any form as a fertilizer, without an explicit printed certificate of the fact conspicuously affixed to every package of such fertilizer.

Sect. 5. Any person selling or offering or exposing for sale any commercial fertilizer without the statement required by the first section of this act, or with a label stating that said fertilizer contains a larger percentage of any one or more of the constituents mentioned in said section than is con-

tained therein or respecting the sale of which all the provisions of the foregoing sections have not been fully complied with, shall forfeit fifty dollars for the first offense and one hundred dollars for each subsequent offense.

SECT. 6. This act shall not affect parties manufacturing or importing fertilizer for their own use and not to sell in this state.

SECT. 7. The secretary of the board of agriculture shall annually cause to be analyzed at the New Hampshire College Agricultural Experiment Station one or more samples of every commercial fertilizer or fertilizer material sold or offered for sale under the provisions of this act. Said secretary shall cause a sample to be taken, not exceeding two pounds in weight, for said analysis, from any lot or package of such fertilizer or fertilizer material, which may be in the possession of any manufacturer, importer, agent, or dealer in this state; but said sample shall be drawn in the presence of the parties in interest or their representatives and taken from a parcel or a number of packages, which shall not be less than ten per cent. of the whole lot sampled, and shall be thoroughly mixed and then divided into equal samples and placed in glass vessels and carefully sealed and a label placed on each, stating the name or brand of the fertilizer or material sampled, the name of the party from whose stock the sample was drawn, and the time and place of drawing, and said label shall also be signed by the person taking the sample and by the party or parties in interest, or their representative present at the drawing and sealing of said samples; one of said duplicate samples shall be retained by the secretary and the other by the party whose stock was sampled; and the sample retained by the secretary shall be for comparison with the certified statement named in section 1. The result of the analysis of the samples shall be published from time to time, together with such additional information as circumstances may advise, in reports or bulletins by the New Hampshire College Agricultural Experiment Station and in the biennial report of the state board of agriculture. All parties violating this act shall be prosecuted by the secretary of the board of agriculture.

SECT. 8. The amount of license fees received by said secretary by virtue of this act shall be paid by him to the treasurer of the state of New Hampshire. The treasurer of the state of New Hampshire shall pay from such amount, when duly approved, the moneys required for the expense incurred in making the inspection required by this act and enforcing the provisions thereof. Said expense shall include those incurred for laboratory expenses, chemical supplies, traveling expenses, printing, and other necessary matters.

SECT. 9. This act shall take effect July first, nineteen hundred and one, and all acts and parts of acts inconsistent with this act are hereby repealed.

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